**K-5 Math Lesson Plan**

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| **Teacher:**  **Aldous/Wells** | | | **Grade: 5** | | | **Date(s)**: September 2012 |
| **Unit Title:**  Unit 2 - Operations with Whole Numbers and Decimals | | | | **Corresponding Unit Task:**  Teach prior to Task 1 | | |
| **Essential Question(s):**  **How do I use multiplication strategies to solve problems with large quantities?** | | | | | | |
| **Materials/Resources** | | | | **Essential Vocabulary** | | |
| **Teacher:**  **White board, markers,** | | **Student:**  **Math journals** | | | **multiplication/multiply, division/divide, products, quotients, dividends, rectangular arrays, area models, equations, factor** | |
| **Learning Experience** | | | | | | |
| **8 Mathematical Practices:**  √ 1. Make sense of problems and persevere in solving them.  √ 2. Reason abstractly and quantitatively.  √ 3. Construct viable arguments and critique the reasoning of others.  √ 4. Model with mathematics.  5. Use appropriate tools strategically.  √ 6. Attend to precision.  7. Look for and make use of structure.  √ 8. Look for and express regularity in repeated reasoning. | **Common Core State Standards:**  **5.NBT.5**  ***Fluently multiply multi-digit whole numbers using the standard algorithm.***  **(Correlates to NCSCOS Math Objective 1.03)** | | | | | |
| **I Can Statement(s):**   * **I can use the standard algorithm to multiply** * **I can fluently multiply multi-digit numbers using the standard algorithm.** | | | | | |
| **Activating Strategy/Hook:** (How will students become cognitively engaged and focused?)  Play “I have … Who has…” Multiplication game. The website, Superteacher.com has a good set of cards or you can create your own. | | | | | |
| **Teacher Directed:**  Today we will move from the picture representation of the area models to the more abstract partial product and lattice multiplication.  Partial Product:  In partial product multiplication, each factor is thought of as a sum of ones, tens, hundreds, and so on. Each part of one factor is then multiplied by each part of the other factor, and finally, all of the resulting partial products are added together.  67  X 53  As we did with the area models: think of 67 as 60 + 7 and 53 as 50 + 3  Multiply each part of one sum by the other part of the other and add the results   |  |  |  |  | | --- | --- | --- | --- | | 60 x 50 = 3000 | 60 x 3 = 180 | 50 x 7 = 350 | 3 x 7 = 21 |   3000 + 180 + 350 + 21 = 3551  71  X 49  Think of 49 as 40 + 9  Multiply 9 x 71 and 40 x 71 (remind students about the shortcuts they have learned when multiplying numbers that end in zero)  At this point discuss with students that they are multiplying 40 or 4 tens, not just a 4.   |  |  | | --- | --- | | 9 x 71 = 639 | 40 x 71 = 2840 |   71  X 49  639  +2840  3479  Lattice Multiplication  Lattice multiplication uses a “lattice” grid to multiply numbers. It can be helpful for students because it breaks the entire problem down into single digit multiplication and addition.  67  X 53  **6 7 x**   |  |  |  |  | | --- | --- | --- | --- | | 3 | 3  0 | 3 (1)  5 | **5** | | 5 | 1  8 | 2  1 | **3** | |  | 5 | 1 |  |   Create a 2 x 2 grid. Write the first factor across the top and the second down the right side. divide each box in-half along the diagonal. Multiply the numbers in the corresponding boxes:ex. 6 x 5 = 30. Write the 30 in the box so that the tenths digit (3) is in the left side of the box and the ones digit (0) is in the right side. Repeat this for all 4 boxes. Once all have been multiplied, add down the diagonal rows. In the second diagonal column you are adding 5 + 2 + 8 = 15. Write the 5 in the area below the diagonal and regroup the one to the next diagonal row. So the next row you will add 3 + 1 + 1(the one carried from the previous column) = 5.  The answer is read starting at the upper left and reading down and to the right. 3,551  93  X62  9 3 x   |  |  |  |  | | --- | --- | --- | --- | | 5 | 5  4 | 1(1)  8 | 6 | | 7 | 1  8 | 0  6 | 2 | |  | 6 | 6 |  |   The answer is 5, 766  More information and resources on teaching multiplication can be found at [www.nsa.gov/academia/\_files/collected\_learning/elementary/arithmetic/Smiling\_at\_Two\_Digit\_Multiplication.pdf](http://www.nsa.gov/academia/_files/collected_learning/elementary/arithmetic/Smiling_at_Two_Digit_Multiplication.pdf)  [www.softschool.com](http://www.softschool.com) | | | | | |
| **Guided Practice:**  Put the following on the board  79  X38    In student journals, guide the students through breaking the problem into its partial products, as modeled above.  79 x 8 = 632  79 x 30 = 2370 Add 632 + 2370 = 3002  Pair the students or put in small groups. Give them a set of three problems to solve. As they are solving they must check each other’s steps and final answer.  Once they have completed the problems, have them take the same problems and solve using lattice multiplication. Again, the groups or pairs should be checking each other’s steps and answers.  Put the following on the board:  *John invited 24 of his friends to his birthday party. He bought bags of marbles to give each of his guests. Each bag contained 64 marbles.*  Use the lattice multiplication method to determine total number of marbles John’s friends received. Use what you know about lattice Multiplication to explain why your answer is correct. Use words and/or numbers in your explanation. | | | | | |
| **Independent Practice:**  Have the students solve the following. They should use a mix of the lattice method and partial product method. Each method should be used at least twice.  *1. The 5th grade collects 34 boxes of noodles. Each box contained 75 individual noodles. How many total noodles did the 5th grade collect?*  *2. A 3rd grade student brought in 15 bags of canned goods. If each bag held 15 cans, how many cans did the 3rd grade student bring in?*  *3. Mrs. Moore took her 4th grade class of 25 students to the aquarium. Admission for each student was $12. What was the total amount of money needed for the field trip?*  *4. If there are 60 minutes in one hour, how many minutes are in a 24 hour day?*  *5. An adult human has 32 teeth. If there are 83 adults in a room how many teeth is that in all?* | | | | | |
| **Closing/Summarizing Strategy:**  Solve the following using lattice and partial product.  55  X49 | | | | | |
| **Differentiation Strategies** | | | | | | |
| **Extension** | | | **Intervention** | | | **Language Development** |
| *An organization held an all you can eat pasta dinner for a local charity and sold tickets for $32.oo each. That night 215 people came. What was the total amount they raised for the charity?*  *$6,880*  *A popular rock band has scheduled 29 cities for the upcoming tour. Their goal is to sell 350 tickets for each show. How many tickets in all need to be sold for them to meet that goal?*  *10,150* | | | Give the students a multiplication problem. Have the students write out and verbally explain each step of the process. Emphasizing the steps of breaking the numbers into parts to multiply. | | | Given a sample problem, the students write a brief constructed response explaining the process to find a product using the partial product method and/or lattice method |
| **Assessment(s):**  Find the products to the following problems by either the, Partial Products Method, or the Lattice Method of multiplication.   1. 36 x 52 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. 28   X 46  3. 23 4. 34  x 38 x 15  Calculate \_\_x \_\_\_ Calculate \_\_x \_\_\_  Calculate \_\_x \_\_\_ Calculate \_\_x \_\_\_  Calculate \_\_x \_\_\_ Calculate \_\_x \_\_\_  Calculate \_\_x \_\_\_+ Calculate \_\_x \_\_\_ + \_\_\_\_\_\_\_\_  Then Add Then Add  Multiply using Lattice   1. 23 x 38 = \_\_\_\_\_\_\_ 2. 34 x 15 = \_\_\_\_\_\_\_\_ | | | | | | |
| **Teacher Reflection:** (Next steps?)   * What went well? * Specific notes about students’ thinking * Student understandings/misconceptions * What do I need to reteach/review tomorrow or in the future? * New ideas or changes for next time | | | | | | |